schools are lacking. Indeed it appears from the papers that the other public buildings of the State of Michigan share these defects with the schools; the court-house, according to Mr. Waters, is little better than a death-trap, and the others are far from being what they should be.

WE have received the *Report and Proceedings* (vol. i. part 1) of the Bristol Naturalists' Society. The former is very satisfactory, as it shows an increase in the membership and an increased attendance at the meetings. The finances, too, are in a sound state, with the exception of the special library fund, which appears to be in debt. The Council urge the formation of similar Societies in neighbouring towns, and their affiliation to the Bristol Society, "for so much can be done for science by mutual intercourse and encouragement." The contents of the *Proceedings* (the part being profusely illustrated) reach a high standard. Prof. Lloyd Morgan publishes the third and fourth parts of his "Contributions to the Geology of the Avon Basin," dealing with the Portbury, Clapton, and Portishead districts. Mr. Wilson, Curator of the Bristol Museum, gives the history of the exploration of the bone-cave or fissure in Durdham Down, from which the series of mammalian remains in the Bristol Museum were obtained. Lists are given of the remains found, and of the principal publications referring to them. Mr. Bucknall publishes Part 9 of his "Fungi of the Bristol District," while Mr. Griffiths writes on the *Cicada septemdecim*, "the seventeen-years' locust" of America. There are several other more general papers. At the end is the continuation of the "Flora of the Bristol Coal-Field," edited for the Society by Mr. J. W. White, the compilation of which was commenced seven years ago, and which has continued steadily ever since. One thousand and three species have already been treated as inhabitants of the district. The present part, which is the sixth, treats of *Glumiferæ Gymnospermæ* and *Cryptogameæ Vasculares*. It is proposed to begin at once revising the earlier parts with a view to the preparation of a second edition, and an appeal is made to members and friends to aid in making the work as complete and accurate as possible. It is hoped in this way to lay before the Society a thoroughly worthy account of the botanical wealth of Bristol.

THE Otago Acclimatisation Society have, during the past year, been highly successful in their fish-culture operations in New Zealand. The utmost is being done to naturalise Salmonidæ to the waters of that country, and from all accounts the experiment is likely to succeed. The Society are about to try the experiment of retaining salmon in fresh waters at Marshall's Creek with a view to testing the assertion that it is not a physiological necessity for fish to repair to the sea to render them capable of reproduction.

NEWCASTLE-UPON-TYNE Free Library, though suffering from a fire which arose from the flue of a sunlight in the reference room getting overheated, and caused both reference and issue department to be closed for many days, nevertheless records general prosperity, boasting at the same time the issue of the smallest percentage of fiction of twelve of the largest free libraries in England. A new catalogue of 10,000 books added to the lending department during the five years and a half the library has been open, and another of the juvenile department, are being prepared to meet the want that must be so urgent in a library where crowded applicants can gain knowledge of the treasures offered them by no other channel. Only thirteen volumes, not worth 1*l.*, have been lost during the same length of time, not reaching 1 in 100,000 issues; in the juvenile department only 1 in 185,000; and during the past year not one volume! Yet, as if this were not satisfactory, the Committee have decided to make every borrower (*i.e.* over 8500 persons) renew his ticket yearly, instead of once in five years, for the sake of correcting addresses. Balancing this enormous aggregate of trouble to the public, *plus* that of the library officials in carrying it out, against that of the latter in tracing borrowers who have removed without signifying the same to them, we cannot think that this shows either the wisdom of the serpent or the harmlessness of the dove! Science and other educational classes, so aptly carried on under a free library committee, were attended by 141 students in 1884–85, and, we are glad to see, by 186 in 1885–86. Three branch reading-rooms, however, we note with surprise, were not attended sufficiently to make it worth the expense of keeping them open.

THE intelligent community of Watford, to whose various clubs and classes, all working together under one committee, we called attention some time ago, find co-operation so successful that they have published a bound hand-book of 160 pages, containing, besides a library catalogue with supplementary lists down to September 1886, all the other varied information which they have to lay before the public. The principal item to notice is that they have succeeded in adding the University Extension lectures to the numerous branches of art and science already under their care. The name of "The Free Library 'College' of Science, Art, Music, and Literature" has now been adopted, as denoting the "collection" of schools of which it consists. Sir John Lubbock has accepted the new office of President of it, and on Tuesday, the 28th ult., he delivered an opening address. He chose the subject of ants and their ways; and, since natural history is among the scientific pursuits of the college, it was both a specially fitting and, we need not add, a generally interesting subject. The nucleus of all the various work carried on at Watford is a free library rate which even now only brings in 240*l.* a year. Such success should therefore encourage such smaller towns as cannot find separate committees each with its own work and expenditure also.

AMONGST the papers read at the International Congress of Orientalists at Vienna were one by Dr. Stein on the Hindu Kush and Pamir in Iranian geography, and one by Prof. Kuhn on the Indian dialects spoken in the Hindu Kush. Prof. de Lacouperie also read a paper on the aboriginal languages of China.

MESSRS. SPON have in the press: "Metal Plate Work, its Patterns and their Geometry," by C. T. Millis, M.I.M.E.; "A Practical Hand-Book on Pump Construction," by Philip R. Björling; "Spons' Mechanics' Own Book" (second edition); "Quantity Surveying," by J. Leaning (second edition, revised and enlarged); "A Treatise on Secondary Batteries," by Prof. Silvanus P. Thompson, D.Sc., B.A.

THE additions to the Zoological Society's Gardens during the past week include a Mona Monkey (*Cercopithecus mona*) from West Africa, presented by Mr. W. P. Hewby; a Malbrouck Monkey (*Cercopithecus cynosurus*) from East Africa, presented by Mr. Lionel R. Crawshay; a Rough Fox (*Canis rudis*) from British Guiana, presented by Capt. J. Smith; a Hairy-rumped Agouti (*Dasyprocta prymnolopha*) from Guiana, presented by Mrs. Otto Fell; a Common Hedgehog (*Erinaceus europæus*) British, presented by Madame Tina Mazzoni; two Moorhens (*Gallinula chloropus*), British, presented by Lord Moreton, F.Z.S.; a Horned Viper (*Viper cornuta*) from South Africa, presented by Mr. C. B. Pillans.

OUR ASTRONOMICAL COLUMN

PERSONAL EQUATION IN OBSERVATIONS OF DOUBLE STARS.—M. Bigourdan, of the Paris Observatory, has taken the above as the subject of his Thesis for the degree of Doctor of Physical Science. In an historical review of the subject he refers to the labours of Dawes, W. Struve, O. Struve, Dunér, O. Stone, F. R. Helmert, and T. N. Thielo. He dwells particularly on the researches of

O. Struve, who has persevered so assiduously in the observations of artificial stars initiated by W. Struve. M. Bigourdan shows, however, that by this method it is not possible to eliminate the errors due to the instrument itself, and especially to the object-glass. But it is M. Bigourdan's opinion that it is difficult, if not impossible, to avoid the employment of artificial stars in determining personal equation in measures of double stars, and he has accordingly devised an apparatus, which he describes as simple and of moderate cost, by means of which observations of artificial stars can be made at any time, and which he considers to be free from the objections which have been urged against Struve's method. In this apparatus the plate pierced with holes which form the images of the "stars" and the viewing lenses, are carried by one tube which is movable round a horizontal axis, so as to vary the inclination of the eyes with respect to the horizon; the pierced plate rotating in its own plane so as to vary the angles of position of the artificial coupler. M. Bigourdan gives in the Thesis a great number of measures made with this instrument, deduces a formula for his personal equation in position-angle, and shows how the application of the corrections deduced from it improves the observations.

PUBLICATION DER ASTRONOMISCHEN GESELLSCHAFT, NO. XVIII.—This is a paper by Herr Romberg, of Pulkowa, containing the approximate positions of stars whose places (chiefly as comparison-stars for observations of planets and comets) are given in vols. lxvii. to cxii. of the *Astronomische Nachrichten*, arranged in order of right ascension and reduced to the epoch 1855. This work is a continuation of a similar one executed by Schjellerup for vols. i. to lxvi. of the same periodical, forming No. VIII. of this series of publications, and is similar in form to it. The right ascensions are given to seconds of time, and the declinations to tenths of a minute of arc, and Herr Romberg expresses a hope that his Catalogue may be useful not only as an index to such a large number of observations of stellar positions, but also as a groundwork for accurate determinations of the star-places. The total number of stars in the Catalogue is about 8000, the great majority of them being fainter than the seventh magnitude.

ASTRONOMICAL PHENOMENA FOR THE WEEK 1886 OCTOBER 10–16

(FOR the reckoning of time the civil day, commencing at Greenwich mean midnight, counting the hours on to 24, is here employed.)

At Greenwich on October 10

Sun rises, 6h. 17m.; souths, 11h. 47m. 1·6s.; sets, 17h. 17m.; decl. on meridian, 6° 43′ S.: Sidereal Time at Sunset, 18h. 34m.

Moon (Full on October 13) rises, 16h. 37m.; souths, 22h. 19m.; sets, 4h. 11m.*; decl. on meridian, 4° 7′ S.

Planet	Rises	Souths	Sets	Decl. on meridian
	h. m.	h. m.	h. m.	° ′
Mercury ...	... 7 7 ...	12 20 ...	17 33 ...	9 57 S.
Venus ...	... 4 56 ...	11 0 ...	17 4 ...	0 4 S.
Mars ...	... 10 46 ...	14 49 ...	18 52 ...	21 50 S.
Jupiter...	... 6 11 ...	11 46 ...	17 22 ...	5 29 S.
Saturn...	... 22 18* ...	6 20 ...	14 22 ...	21 22 N.

* Indicates that the rising is that of the preceding evening and the setting that of the following morning.

Occultations of Stars by the Moon (visible at Greenwich)

Oct.	Star	Mag.	Disap.	Reap.	Corresponding angles from vertex to right for inverted image	
			h. m.	h. m.	°	°
12 ...	*f* Piscium ...	... 5½ ...	23 58 ...	0 15† ...	40	19
14 ...	μ Ceti ...	... 4 ...	18 11 ...	19 1 ...	46	272
16 ...	θ^2 Tauri ...	... 4½ ...	18 52 ...	19 36 ...	98	216
16 ...	θ^1 Tauri ...	... 4½ ...	19 1 ...	19 27 ...	127	186
16 ...	80 Tauri ...	... 6 ...	19 25 ...	20 4 ...	24	287
16 ...	81 Tauri ...	... 5½ ...	19 36 ..	20 20 ...	32	279
16 ...	B.A.C. 1391	... 5 ...	20 5	near approach	155	—
16 ...	85 Tauri ...	... 6 ...	20 5 ...	20 59 ...	53	255
16 ...	Aldebaran	... 1 ...	22 37	near approach	155	—

† Occurs on the following morning.

Variable Stars

Star	R.A.	Decl.			
	h. m.	° ′		h. m.	
U Cephei ...	... 0 52·2 ...	81 16 N. ...	Oct. 14,	5 32	*m*
S Cassiopeiæ	... 1 11·3 ...	72 1 N. ...	,, 10,		*M*
λ Tauri ...	... 3 54·4 ...	12 10 N. ...	,, 10,	3 1	*m*
			,, 14,	1 53	*m*
U Monocerotis	... 7 25·4 ...	9 32 S. ...	,, 13,		*m*
U Coronæ ...	... 15 13·6 ...	32 4 N. ...	,, 12,	18 52	*m*
			,, 16,	5 43	*m*
U Ophiuchi ...	... 17 10·8 ...	1 20 N. ...	,, 13,	3 39	*m*.
		and at intervals of		20 8	
W Sagittarii	... 17 57·8 ...	29 35 S. ...	Oct. 13,	2 0	*M*
U Sagittarii...	... 18 25·2 ...	19 12 S. ...	,, 11,	19 0	*m*
			,, 14,	19 0	*M*
R Scuti ...	... 18 41·4 ...	5 50 N. ...	,, 12,		*M*
β Lyræ...	... 18 45·9 ...	33 14 N. ...	,, 14,	19 0	*M*
R Lyræ ...	... 18 51·9 ...	43 48 N. ...	,, 13,		*M*
η Aquilæ ...	... 19 46·7 ...	0 43 N. ...	,, 11,	22 0	*M*
V Cygni ...	... 20 37·6 ...	47 44 N. ...	,, 15,		*M*
T Capricorni	... 21 15·7 ...	15 38 S. ...	,, 13,		*M*
δ Cephei ...	... 22 24·9 ...	57 50 N. ...	,, 12,	19 0	*m*
S Aquarii ...	... 22 51·0 ...	20 57 S. ..	,, 12,		*M*

M signifies maximum; *m* minimum.

GEOGRAPHICAL NOTES

AT a recent meeting of the Anthropological Institute in connection with the Colonial and Indian Exhibition, Mr. Pryer, of the Civil Service of British North Borneo, read a paper on the natives of this region. The main race, the Dusuns, are in all probability descendants of a mixed aboriginal and Chinese ancestry, and as we come nearer to the coasts the sub-tribes mix and blend with each other and with aliens, till on the east coast there is very little of the native type left at all, a race rapidly springing up there of very cosmopolitan origin. On the west coast there are more natives and fewer aliens, but much the same thing is occurring there on a smaller scale. It is difficult to say where the Dusun ends and the Dyak proper begins; the former were at one time head-hunters, but they are now settling down under the North Borneo Company quietly to rural toil. They are thriving and increasing, and there is no fear of their melting away and disappearing, as so many races have done when brought in contact with the white man. The same may be said of the sea-coast races, especially of the Bajans. The Sooloos are the principal fishermen, and, like the rest, are now settling down to a more quiet and orderly life. The first true tribe of the interior arrived at from the east coast is the Booloodoopy, a somewhat singular people, many of them having strangely Caucasian features, or, at all events, departing largely from the ordinary Mongolian type. Mr. Pryer describes several other tribes of the interior, and he inclines to the idea that the Chinese type is far more predominant in Borneo, even amongst the Dyaks, than has generally been supposed. He does not think that the Chinese went over in bodies to North Borneo, but rather that in the long course of Chinese trade with and settlement in the island, a slow and steady infiltration of Chinese blood, though not of Chinese speech or manners generally, took place.

AT a late meeting of the Paris Geographical Society M. Hamy made a communication on an exhibition of collections from the French possessions in West Africa in the Jardin des Plantes, contributed by the Museum of Natural History and that of Ethnography. The exhibition, he said, was composed of two sections, one devoted to natural history, the other to ethnography. The first showed that the countries were rich in iron and copper, which had ever furnished the natives with indispensable implements and utensils. Trees and various plants abound, and game is not rare. Numerous races live and have lived in these regions. The exhibition shows how they are at present distributed in West Africa. There are four groups of Negroes:—(1) The Negrillos or Pygmies, the most western race. They live now only in small scattered colonies in the most unhealthy spots, such as the estuary of the Ogwe, and the interior of Mayonbo; they are called Okoa, Bongoa, Bakké-bakké, Babonko, &c. (2) The second group is brachycephalous, of middle height, and lives principally on the right bank of the Lower Congo, but particularly on the Loango. They work in iron, and are far advanced in the mechanical arts. (3) The Mpongos, or people of the Gaboon, who have been in contact